

PROJECT # 8
Task 6 - Traveler Information Services (TIS)

**Scenarios for Private Sector/Partnership TIS
Opportunities**



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1. INTRODUCTION

This working paper is the outcome of Task 6-Develop Scenarios for Private-Sector/Partnership Opportunities-of the I-95 Corridor Coalition's Project 8-Traveler Information Services. This paper was presented to the project's technical review committee for review and consensus. The committee's comments, recommendations, and assigned action items with respect to this paper have been analyzed and substantively included in the present Revised Draft. As well, the text of this paper will be incorporated in the Final Report for this project.

1.1 EXECUTIVE OVERVIEW

The phrase *public/private partnership* has been used to encompass many different types of relationship, with varying levels of formality, cooperation, coordination, communication, and sharing of resources, risks, revenue, profits, and costs. In addition, many public agencies and private firms have very different levels of commitment to the idea of a public/private partnership. Because of this, one of the major objectives of this document is to establish a definition of public/private partnerships, clearly identifying what a public/private partnership is and what it is not. Using this definition as context, and coupling the results of previous tasks, private-sector interviews, and relevant literature, this document develops three important areas:

- + "Principles of Partnership";
- + a framework for Corridor-wide Traveler Information System public/private partnerships; and
- + scenarios for the implementation of a Corridor-wide Traveler Information System.

Implementation options for a Corridor-wide Traveler Information System (CTIS) range from a primarily public to a primarily private scenario with various public/private partnership scenarios in between. Since many aspects of information gathering, fusing, and especially delivery involve the use of privately owned assets and expertise, partnerships are envisioned in many traveler information services. Privately owned and operated assets, such as commercial traffic reporting centers, high-speed landline and wireless networks, kiosks, radio and television stations, online

services, in-vehicle navigation devices, hand-held devices, and various other traveler information technologies have already gained or are currently gaining public acceptance and will provide many of the core infrastructure elements necessary to support traveler information services in general, and a Corridor-wide Traveler Information System in particular.

In order for Corridor-wide Traveler Information System public/private partnerships to be successful, however, the I-95 Corridor Coalition needs to leverage the assets of the Coalition member agencies and to develop new ways of doing business. To accomplish these objectives, viable scenarios and model agreements need to be derived to answer key private-sector questions relating to, among other things, procurements, privatization, profit- and revenue-sharing, liability, and intellectual rights.

1.2 PROJECT OBJECTIVES

The I-95 Traveler Information Services project is intended to implement an advanced traveler information system tailored to the unique needs of the Northeast Corridor. The system will acquire and disseminate information on roadway traffic conditions, and other pertinent transportation information throughout the Corridor. The system will use a variety of static and dynamic information, ranging from transit schedules and call-in reports to real-time traffic monitoring data and transit status information. The system will ingest, aggregate, and fuse these data in a database architecture that supports dissemination through a variety of communications systems and services to help travelers in the I-95 Corridor choose the most efficient transportation modes and/or routes.

This Project's objectives are:

- + To present a conceptual design and requirements for a Corridor-wide Traveler Information System; and
- + To identify opportunities and principles for public/private partnering to provide traveler information services.

1.3 TASK 6 APPROACH

The approach to this task began with a review of the results of Tasks I-Inventory of TIS and Commercial Opportunities in the Corridor-as well as an understanding of the conceptual design being developed in Task 5. Using these inputs, we have developed a variety of public/private partnership implementation options for Corridor traveler information services. We interviewed representatives of potential private-sector partners in order to obtain their input on the scenarios, and on the barriers to and requirements for public/private partnering.

Among other considerations in the development of plausible public/private partnership scenarios for the Corridor-wide Traveler Information System, we have assessed the barriers to successful public/private partnerships. These barriers include:

- + Legal, cultural, and other institutional barriers in how the public sector procures and manages contracts:
- + The reality of consumer acceptance and market development potential for TIS goods and services.

1.4 DOCUMENT ORGANIZATION

This document is divided into six sections:

Section I-Introduction--provides an overall view of the project, this task, and our findings.

Section Z-Principles of Partnership-discusses the objectives, interpretation, and features of public/private partnerships.

Section 3-Framework for scenarios-discusses the context and bases for our scenarios of public/private partnering, including the proposed architecture of a Corridor Traveler Information System, existing public/private partnerships, and likely regulatory and public-policy regimes.

Section 4-Scenarios of public/private partnering-describe the scenarios we think are likely for public/private partnerships in the provision of traveler information.

Section 5-Considerations in public/private partnership agreements-provides a detailed “checklist” of what a public/private partnership agreement must address.

Section 6-Actions for the Coalition--discusses actions the Coalition or its member agencies must take to facilitate public/private partnering.

1.5 REFERENCES

The following documents were particularly important in development of this working paper:

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David E. Osborne and Ted Gaebel. *Reinventing Government: How the Entrepreneurial Spirit Is Transforming the Public Sector*. Reading, Mass.: Addison-Wesley, 1992.

Raman K. Patel. *IVHS in Japan: A Report on ITE's IVHS Study Tour*.

"Procurement Issues in IVHS Development and Deployment (White Paper)"

"A Public-Private Partnership (White Paper)"

2. PRINCIPLES OF PARTNERSHIP

2.1 OVERVIEW

This section discusses the objectives, interpretation, and features of public/private partnerships.

Because of the widely disparate views about and experiences with public/private partnerships, we have sought consensus from members of the I-95 Corridor Coalition and the Public/Private Partnerships Forum on a set of Principles for Partnership that can be used to help design and evaluate various public/private sector partnership scenarios.

Among the Principles for Partnership that we have sought to establish are:

- + What is the definition of public/private partnerships and what is the range of acceptable options to be considered?
- + What are the objectives of public/private partnerships for the I-95 Corridor-wide Traveler Information System?
- + What, if any, are the baseline TIS services that must not be compromised by any public/private partnership scenario? (These are discussed in Sections 3.5 and 3.6.)
- + What features are desirable in a public/private partnership agreement?
- + What barriers impede the development of public/private partnerships?

2.2 WHAT IS A PUBLIC/PRIVATE PARTNERSHIP?

We propose the following definition:

A public/private partnership is a pooling of resources between private- and public-sector entities, that, in providing a set-vice to others, achieves objectives of the individual partners. The pooling may be formal or informal, and need not be a true partnership at law.

Let's break this definition down into its key elements:

The pooling of resources is critical. A public agency's buying a service from a private company is not a partnership under our definition. The partners must pool or share their assets, staff, cashflow, or powers-and risks and rewards-and **must also share in the governance of the partnership**. The pooling need not be equal, but there must be some sense that the partners are "peers".

Providing a service to others: The point of the partnership is to *do* something, to achieve a common objective-for example to provide a new highway through the private construction and operation of a turnpike on a public right of way.

Achieves objectives of the individual partners: The paradox of any partnership, joint venture, or similar enterprise is that the participants hope to achieve their several objectives by joining together to achieve a *common* objective. Section 2.4.3 discusses this paradox further.

The pooling may be formal or informal: The partnerships discussed in this paper do not necessarily have to be formalized, although public agencies have institutional difficulties with the lack of formal documentation. as discussed in Section 5.1.

A public/private partnership, as discussed in this paper, need not (and usually will not) be a **true partnership at law**: In business law, *partnership* means something quite specific, particularly in contrast with other forms of business organization, such as the corporation or the sole proprietorship. In this paper, and indeed in this project over all, we mean arrangements that might be considered "partnerships in spirit", not necessarily in fact.

2.3 OTHER WAYS FOR THE PUBLIC SECTOR TO WORK WITH THE PRIVATE SECTOR

Under the definition given above, the following are not public/private partnerships:

- + any kind of cash-for-goods or -service transaction where one side is clearly the customer, the other the merchant-this encompasses most government/business transactions:
- + barter between private- and public-sector entities, such as trading use of a right of way for communication bandwidth and equipment;
- + day-to-day cooperation between, for example, a commercial traffic reporting firm and employees of a department of transportation.

A more pragmatic definition of a public/private partnership might be:

A public/private partnership is an arrangement between a public agency and a private firm that does *not* fall into the usual categories of government/business interaction, i.e., of regulation and licensing, or of straightforward contracting.

In other words, a public/private partnership, in these terms, requires government and business to find new ways of arranging their joint affairs. This definition might be thought to encompass any kind of “non-standard” arrangement between public and private sectors, such as barter and even some merely cooperative relationships. In our view, this latter definition is so vague as to make the notion of “partnership” meaningless: consequently, we believe the Coalition will find the first definition much more useful.

Although none of these may be public/private partnerships according to the definition we developed above, they may still be valuable to both parties. Table 2-1 discusses some alternate arrangements between the public and private sectors. For a thorough discussion of such arrangements, see David Osborne and Ted Gaebel, *Reinventing Government*, particularly appendix A.

Table 2-1
Alternate public/private arrangements

Type of arrangement	Definition	Possible applications to traveler information services	Analysis
Licensing	The government makes it illegal to perform a service without a license; and then defines how and under what terms a license is granted.	Government could license commercial traffic reporting firms. As a condition of their license, they could be required to carry intermodal and safety information.	Imposes a cost on the public sector, with benefit difficult to quantify. Also adds to regulatory burden. Other means may be more appropriate.
Grants	The government gives cash, on certain conditions, to entities (private-sector, third-sector, or junior governments) to do something.	Senior governments could give grants to entities that carry intermodal information.	Grants are risky because businesses can rise up merely to satisfy the grant criteria. Subsidies may be superior.
Subsidies	Similar to grants. Government gives cash to entities to lower their cost of doing something.	Government could subsidize certain kinds of traffic reporting.	In most scenarios, public agencies may "subsidize" the dissemination of information of low commercial but high social value, e.g., transit information; but these subsidies may be costless to the public sector, in the form of reduced fees for data access.
Loans and loan guarantees	Government lends money, typically to creditors that cannot borrow from private lenders or at rates below market, so that the creditor can undertake some activity. Alternately, the government puts its faith and credit behind a third party's debt so that third party can finance some undertaking.	Government could lend money to firms or other entities to gather, consolidate, or disseminate traveler information.	In a time of fiscal restraint, direct financial support of private-sector activities may be hard to justify in the face of other, equally effective arrangements.

Table 2-1
Alternate public/private arrangements-cont.

Type of arrangement	Definition	Possible applications to traveler information services	Analysis
Contracting	Government hires another entity to do something.	Ideal for, e.g., designing, building, or operating a traveler information center, or for doing specific tasks. This working paper is the outcome of a contract.	An extension of the public sector, but using private expertise and flexibility. Lends itself to tasks that can be scoped, with a demonstrable outcome, and that the public sector could do itself. Contracts are easy to structure for transparency and fairness.
Franchising	The government grants an exclusive right to provide a particular service within a particular area or to a particular market. Often combined with regulation of pricing. Common with so-called natural monopolies, such as electricity, gas, and telephones.	Public sector could grant rights to public-agency traveler information or even to right-of-way surveillance devices, on a franchise basis.	For regional centers, a variation on contracting, but with the franchisee's rights more clearly marked.
Public/public partnerships	Unrelated public entities (two cities, for instance) form a joint agency or entity to do something.	The Corridor Coalition is a public/public partnership. Transportation and public-safety agencies could form regional public/public partnerships on the "upstream" end of the traveler information stream to gather and possibly consolidate information for dissemination ("sale") to private entities.	Highly effective in coordinating the related activities of unrelated agencies.

Table 2-1
Alternate public/private arrangements - cont.

Type of arrangement	Definition	Possible applications to traveler information services	Analysis
Convening nongovernment leaders	Bringing together key stakeholders to discuss a problem, with no further government action (at that time).	The Coalition or regional bodies could convene meetings of firms that might have an interest in traveler information, merely to increase the exposure to the possible market. ITS America is a kind of body of this sort.	Useful when more direct action is not possible.
Jawboning	Prominent officials (e.g., the governor) can make something happen just by speaking about it.	Senior officials could jawbone on the need for timely traveler information.	Effectiveness limited.
Seed money	Government makes small, limited investment in an activity to start it going.	Public agencies could fund commercial traveler information ventures for start-up and to demonstrate market.	Government action may be required to open market.
Equity investment	Rather than lend money, government can invest its own funds in an entity.	Public/private partnerships, as discussed in this working paper, may include this category. Equity need not be cash.	Can be valuable way of organizing government's part in a public/private arrangement so long as transparency and fairness are maintained, and the government remains an active investor.
Barter	An exchange of non-cash values. Typically the items traded have little or no market value to the donor.	Agencies can trade right-of-way access (which imposes little cost on the agency) in return for use of the private entity's facilities.	Can be extremely valuable to both sides. Transparency must be maintained.
Quid pro quos	Governments trade one benefit for another. Similar to barter.	In order to get permission to build a traffic-generating facility (e.g., the super-mall contemplated for Silver Spring, Md), developer can be required to develop traveler information facilities.	Some usefulness.

2.4 OBJECTIVES OF PUBLIC/PRIVATE PARTNERSHIPS

This section discusses the why of public/private partnerships, by discussing the objectives of the public- and private-sector partners.

2.4.1 Objectives of Public-Sector Partners

The traveler-information objectives of public-sector agencies are set out in our Working Paper 2. This section discusses why public agencies may choose to use a public/private partnership as the institutional vehicle to achieve these traveler-information objectives.

The public agencies' overarching objective in pursuing partnerships with private entities is to have those private entities use their own resources to meet the agencies' public-policy or operational objectives.

From the point of view of a public agency, a private company brings four things to the partnership table:

- + capital;
- + specific expertise:
- + different management approach; and
- + lower operating costs.

We discuss each of these in turn.

The employment of private capital for public works can be very attractive to a fiscally restrained agency. Two points need to be made here:

The use of private capital elevates rate of return to a prominent position in calculation of a project's feasibility, and consequently makes capture of that return an essential feature in the project's organization. (This is discussed further in Section 5.4.)

The "capital" contributed by a private-sector partner need not be liquid. In the well known example of a common carrier's using a public right of way for its cables, and sharing use of that cable with the right-of-way agency, the cable can be thought of as a capital contribution.

The specific expertise sought from a private-sector partner will vary according to the project. In general, though, the best private-sector partner will be one for whom the proposed partnership is a natural extension of their core business, that is, where the private firm has staff, procedures, and culture that are relevant to the project. For example, a heavy-construction firm would **not** stand out as the obvious entity to participate in information kiosks. On the other hand, sometimes the "expertise" sought from the private partner will merely be how to operate a business.

It is a truism that business has a different management approach than government. A frequent hope of public agencies seeking a public/private partnership is that the partnership will benefit from a "more business-like" approach to its operation. Table 2-2 discusses the drivers of the differences between the public and private sectors.

It is generally held that private firms enjoy **lower operating** costs than public entities in a given business. Although this is a key reason for finding private-sector partners, it can be a touchy issue for public agencies and the policy-makers they are accountable to. A public agency will often want to understand the causes of the lower operating costs, in order to avoid later difficulties. Over all, private firms operate with lower costs than public agencies simply because they are better at optimizing their allocation of resources to a single objective.

Table 2-2

Differences between the public and private sectors

Driver	Public-sector experience	Private-sector experience	Difference that results
Competition	Rarely exposed to competition; never to unfettered competition	Always subject to free competition (except for regulated utilities)	In public, little incentive to implement “best practices” of peers; in private, continuous pressure to improve costs and performance vis B vis competitors
Objectives	“Core” mission and objectives rarely articulated; agencies also must implement overarching public-policy objectives	Focus usually tight on line of business and return on investment (whether expressed or not); social objectives secondary.	Public-agency managers have to juggle many objectives, which are often not congruent.
Measurability	Agency objectives are rarely measurable (though in transportation many are).	Business objectives are often measurable vis a vis competitors; financial objectives measurable vis a vis all potential uses of funds.	Public-agency managers often find it difficult to demonstrate success; similarly, proposals for investment cannot have a clear hurdle.
Financing	Most public agencies can spend money only; managers are thus accountable only for cost.	All private firms (even those notionally not for profit) must be concerned about revenues, and their balance with cost. “Profit centers” are often deep in the hierarchy; and even cost centers can accept and bank revenue.	Great ideas with significant public benefit are often slow to be implemented because it will increase the originating agency’s costs.
Accountability	Public agencies have diffuse accountability: line of command (governor, secretary, commissioner, etc.); legislature (particularly the appropriating committee); community: employees.	Private managers are accountable only to their customers and to their managers, and through the latter to the firm’s stockholders and creditors.	Changes in public-agency operating procedures or proposed projects require consensus-building across wide spectrum of stakeholders.
Risk	Consequences to an agency and its managers of a failed risk can be severe.	Taking of risks-and acceptance of occasional failure-essential feature of the public sector.	Public-agency managers are encouraged to be cautious. Public works are overengineered in order greatly to reduce risks.

2.4.2 Objectives of Private-Sector Partners

This section discusses why private firms may choose to enter into a public/private partnership intended (at least in part) to achieve public-agency traveler-information objectives.

A private firm will be interested in a public/private partnership if that partnership meets the firm's strategic objectives and its requirements for rate of return.

Meeting the firm's strategic objectives: Firms will often turn away from a business opportunity if that opportunity will not lead toward achievement of the firm's overall strategic objectives. In practice, this may mean that the firm will decline entry into a new line of business. The reasons for this are twofold:

- + an extension of the current business can leverage off the firm's investment in and development of proprietary assets (not just physical assets recorded on a balance sheet, but also the firm's employees' expertise and the firm's internal procedures and culture)-a launch into a new business effectively raises the required rate of return; and
- a launch into an unrelated field can be difficult to manage, and can cause the firm's management to lose focus.

Requirements for rate of return: A new business must not only cover its operating costs (after start-up) but must also return enough profit to yield a return on the firm's investment equal to or greater than alternative investments the firm might have made. Although business schools teach rigorous and methodical analysis of this crucial issue, most assessments are made on hope and guesswork. Still, a firm will not enter into a loss-making enterprise without the expectation that the losses will be made up elsewhere in the firm's business (for example, in goodwill with a major customer).

The failure of Project Northstar is instructive. As best can be determined from the public record (reported in Inside IVHS), Nynex executives saw the project as failing *both* tests outlined above.

From the point of view of a private firm, a public agency brings one or more of four things to the partnership table:

- its operation of transportation infrastructure:

- + eminent domain;
- + fiscal power; and
- + regulation of transportation.

We discuss each of these in turn.

Operation of transportation infrastructure: The agencies that form the I-95 Corridor Coalition, and similar agencies at the local level, are uniquely positioned as operators of roads, highways, and bridges. As a result of historical, political, and economic forces, the public sector dominates transportation infrastructure and facilities, particularly highways. Consequently, any private firm wishing to exploit the infrastructure must work with and through the responsible public agency.

Eminent domain is a critical element in many of the new public/private partnerships being discussed. All turnpike projects, no matter how great the private-sector participation, depend on the use of eminent domain to assemble the right of way.

The government's fiscal power is essential for often important measures such as mandatory user or license fees, and for the government's ability to provide low-cost funds to the partnership.

The government's regulation of transportation can create or define the market for the private firm's services, for example, by requiring commercial vehicles to carry a particular kind of device to bypass weigh stations.

2.4.3 The Paradox of Differing Objectives

In a classic partnership, such as a law firm, the partners' objectives are the same (see Figure 1); in the ideal, a kind of "one for all, all for one" pooling of capital, effort, and return. (Of course, in practice, individual partners do not share in all of these equally.)

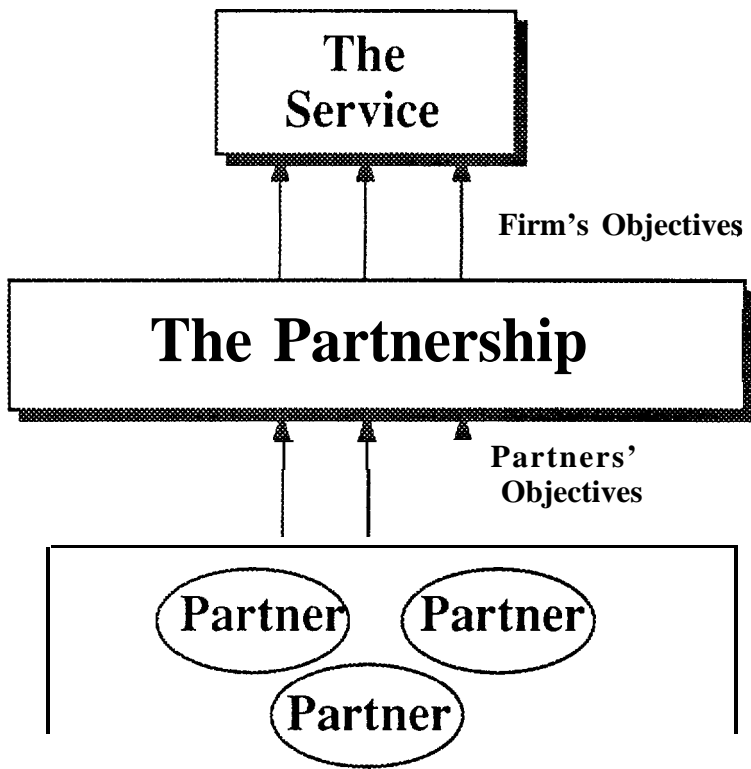


Figure 1

Objectives in a classic partnership

In the partnerships discussed in this paper and elsewhere in the literature on intelligent transportation systems, the private- and public-sector partners have different objectives (see Figure 2):

- + The public-sector partners will want, for example, to improve the dissemination of real-time traffic information to the general public, partly because the public's taxes paid for the surveillance equipment and partly to improve the utilization of the transportation infrastructure, and thus to improve economic efficiency, mitigate environmental impacts, and increase safety.
- + The private-sector partners, bluntly, don't care about the public-sector objectives—reducing congestion, improving the environment, etc.—except as taxpayers, motorists, and citizens, of course. A private-sector partner's objectives will be, for example, to generate a return (profit) by adding value to the information (consolidating it, formatting it by region or for particular travelers), and then through

the sale of the added-value information or through sale of advertising time packaged with the information.

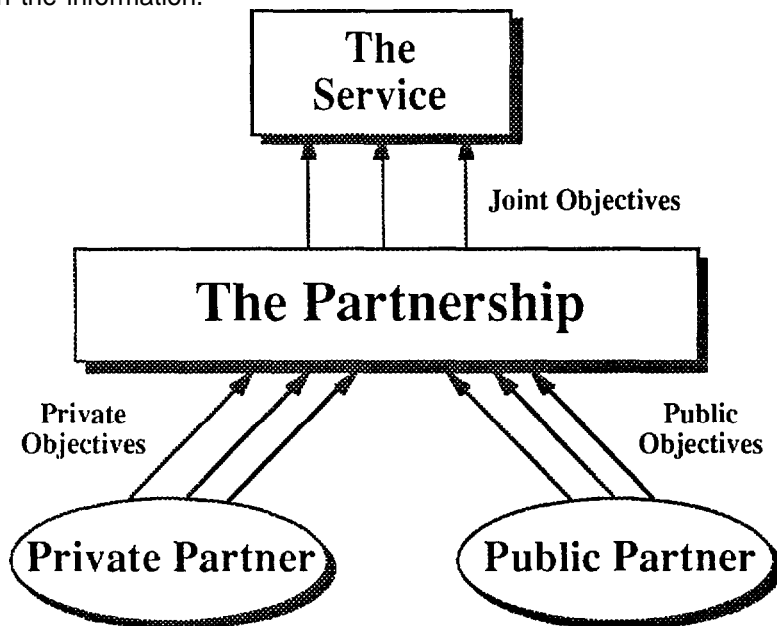


Figure 2

Objectives in a public/private partnership

The paradox is that these two partners, each with their own objectives, will jointly support the provision of a common service.

That the public- and private-sector partners have differing-though, it is to be hoped, not contradictory-objectives will be a rich potential source of disputes between the partners. To avoid these, each side must understand the others' objectives.

2.5 DESIRABLE FEATURES OF PUBLIC/PRIVATE PARTNERSHIPS

This section discusses some of the features desirable in a public/private partnership. Many of these are reflected further in Section 5-Considerations in public/private partnership agreements.

To be successful for any length of time, a public/private partnership must have the following characteristics:

- + the public and private partners' objectives, however different, are integral to the partnership;
- + the public and private partners' objectives are best met through a public/private partnership, rather than through some other arrangement, such as a normal public-to-private contract, or even a laissez-faire approach by the public sector;
- + the partnership has a clear mission, purpose, or objective;
- the public interest is served and appears to be served;
- + the partners are be clear about each other's objectives;
- + the partners understand how they are to relate to each other and how decisions respecting the partnership's operations are to be made;
- + the partners are very clear about the division among them of:
 - ownership of or rights in information and other assets;
 - operations;
 - revenue collection;
 - policy making.

2.6 BARRIERS TO PUBLIC/PRIVATE PARTNERSHIPS

Public/private partnerships may be difficult to form or may founder for the reasons discussed in this section. Some of these barriers are further addressed in Section %-Considerations in public/private partnership agreements.

A public/private partnership may run into political difficulties if the private-sector partners can be seen to be taking an undue advantage of their private-sector. For example, if a private firm seems to be gaining a business advantage in a monopoly-like situation without apparent competition or if a private firm seems to be converting a public good to private uses without compensating the public, the partnership may have to be dissolved.

A public/private partnership may not succeed if the partners don't share a commitment to the partnership's objectives, that is, if the partners have differing view of what the partnership is to do. This may occur if the partners don't reconcile their objectives as discussed in Section 2.4.3.

A public/private partnership may not succeed if the partnership doesn't include a mechanism, implied or explicit, for the making of decisions and the resolving of disputes as they arise.

In the private sector, ad hoc partnerships usually arise from unsolicited proposals. Most public agencies are not authorized to receive unsolicited proposals, or are reluctant-for good reason-to accept such proposals except as completely hedged with limitations. Public agencies, as protectors of the public interest, are dedicated to an open and highly competitive environment when specific and exclusive favors are to be bestowed on a private firm by a public agency-however well compensated the agency might seem.

Note, though, that nothing should impede public agencies from accepting unsolicited proposals where exclusivity is not required. For example, the Ministry of Transportation of Ontario accepted the unsolicited proposal of a Toronto television station to receive (for a nominal fee) live feed from the ministry's CCTV cameras along North America's busiest freeway, Highway 401. The station paid substantial incremental costs to augment the ministry's video switch and to build a communications link. However, the arrangement was not exclusive, and other stations have subsequently taken the feed, compensating the first station for its investment.

Nonetheless, the regular government procurement process, in its quest for regularity and transparency, can sometimes impede the development of exciting and beneficial ventures. As

the Minnesota experience shows, operating agencies must cooperate on a daily basis with their procurement agencies-not treat them as enemies.

Most government agencies are not equipped to “receive” revenue. Most government accounting is on an expenditure basis, and all revenue to such “cost center” agencies accrues directly to the central treasury. Consequently, such agencies are severely disincented to pursue or enter into partnership agreements even where there is revenue-sharing. Note though that particularly in transportation there are special-purpose authorities (for example, for turnpikes, bridges, airports, and so forth) that can and do receive revenue directly to their accounts.

Several potential private-sector partners complained about slowness in decision-making by public agencies, that it can take many months of talking before anything approaching a deal is reached, and that then red tape and lawyers enter and delay or complicate things further. Private firms also find that public agencies can be inflexible, in wanting to apply an inappropriate set of rules on a new arrangement.

Several potential private-sector partners also complained about public agencies’ disregard for private firms’ interest in intellectual property rights. Private firms are reluctant to become involved in public/private partnerships if the public side is going to restrict the private partners’ use of copyrightable or patentable works developed in the partnership or (perhaps worse) is going to put such works in the public domain.

In the current situation, small firms have limited access to commercial opportunities. Significant working-capital requirements are often a characteristic of work with public agencies. As well, small firms are often unable to afford the high marketing costs to find the right agency doing the right thing.

Private firms are concerned about being held liable for the consequences of good-faith dissemination of information. Public/private contracts often impose on the private side the requirement to indemnify the public side against various actions. Traveler information is a new area, and private firms take the issue of liability for the information they distribute very seriously. The public sector does not want the dissemination of traveler information unduly inhibited by concerns for liability. For example, if a traveler information service calculates an optimum route

(based on time or distance) through a high-crime neighborhood and the motorist is assaulted, who will defend the action?

It may be possible that a regime similar to the one for weather is needed. The National Weather Service and private-sector forecasters (for example, Accu-Weather Inc.) disseminate weather forecasts without being inhibited by fear of lawsuits. If this regime seems appropriate for traveler information, actions can be taken to establish it.

3. FRAMEWORK FOR SCENARIOS

3.1 FUNDAMENTALS

3.1 .1 Travelsheds. Not Jurisdictions

Corridor traveler information services are best organized according to how the traveler sees his or her world, rather than how the operating agencies see it. Consequently, Corridor traveler information services must rise above jurisdictional boundaries. The end user does *not know and does not care* who owns a roadway or which city, county, or state he's in.

Instead, he or she thinks of him- or herself in a “*travelshed*”. Just as a watershed marks where water flows in the same direction, a travelshed marks where (most) travel is concentrated. This includes not just travel in the same direction at a given time of day, that is, commuters inbound in the morning and outbound in the evening, but also business travelers arriving or departing to another “travelshed”, and inter- and intra-travelshed commercial traffic.

The focus of Corridor traveler information services is best organized around the Corridor's five significant travelsheds:

- ◆ Boston (including Hartford, Providence, and northern New England)
- ◆ New York (including southern Connecticut, northern New Jersey, and northeastern Pennsylvania)
- ◆ Philadelphia (including Camden, Chester, Wilmington, and central and southern New Jersey)
- ◆ Baltimore-Washington (including northern Virginia)
- ◆ Richmond-Norfolk (including Hampton Roads)

These travelsheds correspond to the three consolidated metropolitan statistical areas identified by the U.S. Bureau of the Census in the Corridor, plus aggregations of the Baltimore and Washington, and Richmond and Norfolk standard metropolitan statistical areas.

3.1.2 Technological change

The introduction of advanced traveler information services will alter how firms presently in the market-such as the commercial traffic reporting firms-must operate. Firms and small entrepreneurs that presently consolidate and disseminate traffic information will have to adapt to the new realities of advanced traveler information systems in general and the Corridor-wide Traveler Information System in particular.

At the present time, commercial traffic reporting firms collect and maintain traffic information through their own surveillance devices (aircraft, cameras) and through relationships, formal and informal, with police and transportation agencies. This information can be thought of as the firms' stock in trade, and is usually treated as proprietary to the firm that developed it. If something similar to our proposed architecture is implemented, a regional traffic information center may supplant the value of these private "databases", and commercial firms will have to focus on their other discriminators, such as their on-air personalities and their relations with their immediate customers (usually radio stations).

3.2 CORRIDOR ISSUES

3.2.1 The Whole Greater than the Sum of its Parts

The entire Corridor, particularly but not exclusively the I-95 right of way, is worth much more than a concatenation of separate lengths of highway. The Corridor's agencies (and taxpayers) would benefit from the Corridor's taking a "Corridor" approach when it is forming partnerships.

3.2.2 Standard Institutional Interface

One barrier to increased commercial development of the Corridor is that each agency in the Corridor has its own manner of procurement and its own decision-making approach. Even sister agencies in the same state (for example, the Pennsylvania Department of Transportation and the Pennsylvania Turnpike Commission) take different approaches. This means that potential vendors and contractors must be savvy about thirty-plus agencies.

The Corridor would benefit, at the very least, by a coordinated and consistent approach to Corridor procurements and decision-making about commercial opportunities. A joint procurement office might be even better: or delegating all procurements to a single agency.

3.2.3 Technical and Equipment Standards

The Corridor would benefit greatly by establishing uniform standards for software and equipment used in intelligent transportation systems. This would allow more firms, at a lower cost, to compete for work throughout the Corridor. This is developed at more length in Section 6.1.

3.3 COMMERCIAL ISSUES

3.3.1 Competition Among Commercial Traffic Reporting Firms

The commercial traffic reporting firms thrive on consolidating inputs across jurisdictional boundaries. They are also jealous of the contents of their databases. Models that have them sharing their information with each other through a public or quasi-public agency are probably unrealistic.

3.3.2 Backward Integration into Surveillance

A possible problem in the usual approach to traveler information is separating surveillance from information. One important variation on the scenarios presented in Section 4.1 would have the operator of the regional traveler information center also collecting information from, for example, roadway sensors. This probably would be organized as some kind of franchise, with the franchisee having some property rights in the sensors. This would allow the private entity to invest in surveillance, and thus to improve advanced traffic management systems.

3.4 PROPOSED SYSTEM ARCHITECTURE

Task 5 of this project is developing a conceptual design of a Corridor-wide Traveler Information System. This section summarizes this design to give a context for the scenarios in Section 4. The architecture will drive how public/private partnerships are organized and indeed whether they can work.

In particular, the key point of the architecture is to generate a critical mass of traveler information that third-party disseminators-public, public/private, or private entities-find easy and attractive to disseminate, and that is therefore more valuable than disaggregated inputs from many public- and private-sector sources.

A Corridor-wide Traveler Information System in conjunction with state-of-the-art surveillance techniques provided through advanced traffic management systems will provide real-time, pre-trip and en-route multimodal information to assist travelers in arriving at their destinations, whether they're traveling within or between travelsheds. As illustrated in Figure 3-1, actionable, real-time traffic and travel information will be collected and disseminated on all modes, including private vehicles, and public and commercial transportation.

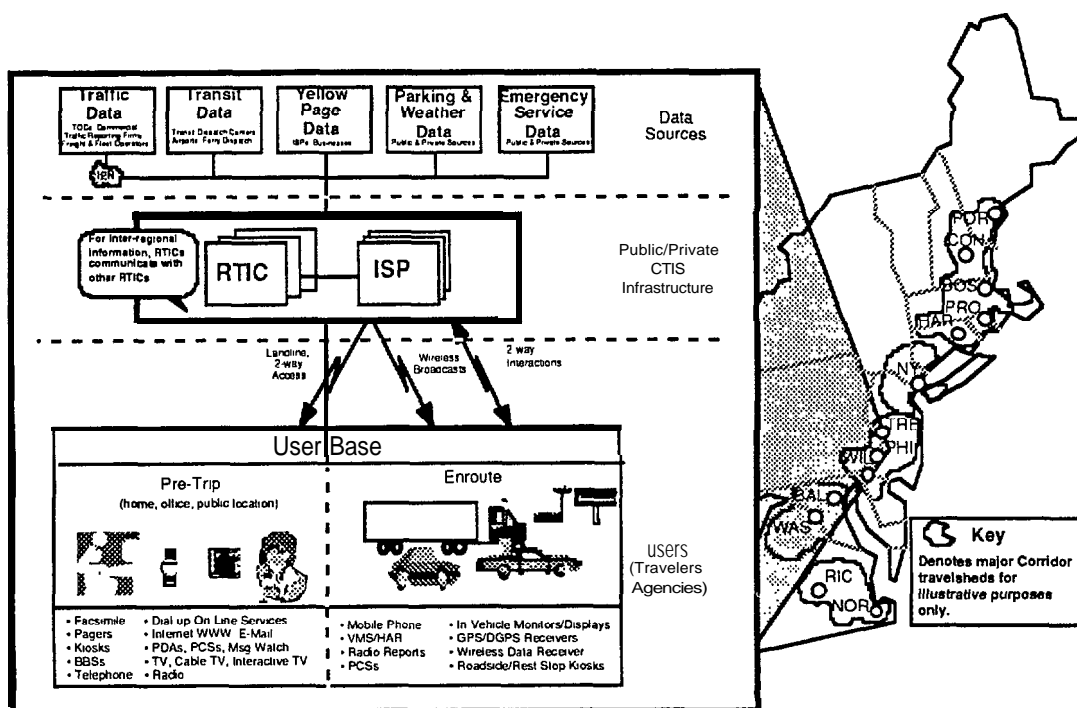


Figure 3-1 CTIS block diagram (illustrating coupling between RTICs and travelsheds, and private-sector involvement through ISPs)

To disseminate traveler information effectively and to provide ubiquitous access to all types of users, a public/private partnership comprising Coalition member agencies and various private-sector sponsors is required. This will result in publicly funded or subsidized regional traveler information centers (RTICs), as well as commercial endeavors by information service providers (ISPs), value-added resellers, communication service providers, and various other types of repackagers, distributors, and other providers of traveler information products and services. These private-sector entities are expected to add information, package traveler information with other types of information, and disseminate information directly to end- users to enhance the effectiveness of the regional traveler information center.

Since the I-95 Corridor consists of several travelsheds (see Section 3.1.1 for a definition), and hosts over 20% of the total U.S. population, a distributed architecture, illustrated in Figure 4, is anticipated for the Corridor-wide Traveler Information System. Aggressive public/private partnerships are required to reach the vast traveling public. To support various users, the architecture of the Corridor-wide Traveler Information System must support information needs of intraurban, interurban, and interregional travelers. The architecture, although distributed, will

appear seamless to the user and will provide information about the entire Corridor from any point within the Corridor.

Before traveler information can be presented attractively to the market and then disseminated, it has to be acquired, fused, validated, organized, and made available in a format suitable for further processing by third parties. In the context of the Corridor-wide Traveler Information System, this will happen on a travelshed basis in each of five regions (Boston, New York, Philadelphia, Baltimore-Washington, and Richmond-Norfolk; see Section 3.1 .1).

As illustrated in Figure 4, each region will house a regional traveler information center, which will act as a clearinghouse for transportation information within its region. The clearinghouse function will use data servers within each region to manage each centers data. These data servers will communicate through the Information Exchange Network (IEN). Each of these regional data servers will collect and maintain data within its region. The regional data servers will also disseminate information to other regional data servers and to the other nodes on the Information Exchange Network.

The primary goal of a regional traveler information center is to compile, integrate, format, and manage data to be distributed to third-party entities for them to disseminate to travelers; thus, the regional centers are the engines for the traveler information marketplace. To meet this goal, four major functions are required:

- + data gathering
- + data fusion and processing
- + data delivery
- + end-user device processing

To support these functions of the regional traveler information center, subsystems will be required in communications, data management, and data distribution. In addition, to support various user and system needs, subsystem components are required for trip-planning, system

security, data fusion, ad-hoc user query, user-interface, data broadcast, map/GIS, and exchange of data between regional traveler information centers.

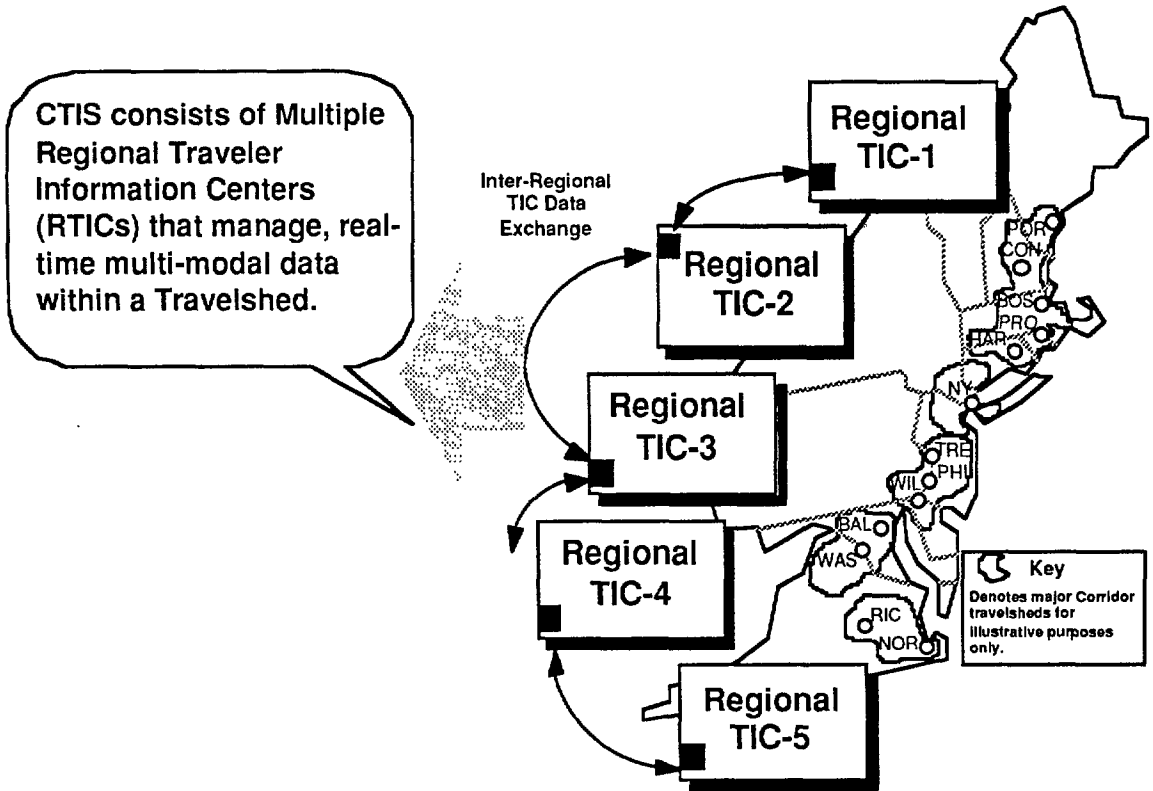


Figure 4
High-level CTIS block diagram illustrating candidate corridor regions/travelsheds

3.5 THE NEEDS FOR PUBLIC/PRIVATE PARTNERSHIPS IN TRAVELER INFORMATION SERVICES

It is recognized that implementation options for traveler information services range from primarily public to primarily private with various scenarios in-between. Consequently, to assess the needs of and identify the potential opportunities for public/private partnerships in traveler information services, the strengths and weaknesses of both implementation options (i.e., primarily public and primarily private) were analyzed. This analysis focused on the three major functions of TIS: data gathering; data fusion and processing; and data dissemination. In the context of traveler information services, *data gathering* describes the function of receiving *information* rather than *raw data*. For example, collecting of raw loop data is not a traveler information function, but

collecting higher-level data, such as link travel times, is. *Data fusion and processing* refers to the consolidating and correlating of data about the same point or area in the transportation network, from multiple sources. It also includes providing additional value to the gathered information through analysis, tailoring, and/or prediction. An example of this might be the use of link travel times to estimate the future state of the transportation network. Finally, *data dissemination* is the delivery of the processed information to the travelers.

The strengths and weaknesses of each sector in performing those functions are summarized in Table 3-1 and discussed in more detail below.

3.5.1 Strengths of Primarily Public Implementations of Traveler Information Services

3.5.1.1 Strength in Data Gathering.

Today, the public sector owns and operates many traffic surveillance, incident management, and transit fleet management systems whose data can be used to support traveler information services. In an environment of fully deployed intelligent transportation systems, these systems can provide even more comprehensive and real-time traffic data, transit status data, and roadway condition data to manage effectively traffic flows and travel within the Corridor. The strength of the public sector in this regard is the ability to leverage the infrastructure and resources of its intelligent transportation systems for implementation of traveler information services. In addition, the public sector is the source of road construction and pavement condition information; therefore, only coordination within the public sector is necessary to gather this information.

Table 3-1 Strengths and weaknesses of public and private sectors in non-partnership traveler information operations

	STRENGTHS	WEAKNESSES
PUBLIC SECTOR	<u>Data Gathering</u> <ul style="list-style-type: none"> · Infrastructure availability · Detailed traffic data · Detailed transit data · Construction data · Detailed road and travel condition data 	<u>Data Gathering</u> <ul style="list-style-type: none"> · Insufficient resource to cover the entire Corridor-designated road network · No data from private transportation service providers (taxi, bus, air) · No data from private parking facilities · Slow adaptation of new technologies
	<u>Data Fusion</u> <ul style="list-style-type: none"> · Integrated transportation management actions and traveler information · Official advisory · Data ownership · Projection of traffic conditions · Historical data maintenance 	<u>Data Fusion</u> <ul style="list-style-type: none"> · Jurisdictional barriers – difficult to accommodate intercity travel information · Modal barriers – difficult to provide integrated multimodal information · Limited traveler services information (e.g., Yellow Pages) · Difficult to obtain private data sources due to competition and conflict of interest · New public agency required to integrate data from multiple sources
	<u>Data Dissemination</u> <ul style="list-style-type: none"> · Roadside information delivery devices and infrastructure · Free of charge · Inherent public information credibility 	<u>Data Dissemination</u> <ul style="list-style-type: none"> · Limited dissemination methods to meet personal and commercial travel needs · Limited response to market needs – beyond scope of traditional responsibility · Limited or no revenue generation capabilities to recover costs of providing service
PRIVATE SECTOR	<u>Data Gathering</u> <ul style="list-style-type: none"> · Seamless jurisdictional boundaries · Market driven technological advances · Market-driven implementation and growth 	<u>Data Gathering</u> <ul style="list-style-type: none"> · Limited to “observable” data on roads · No public transportation system operational status data · Unprofitable markets may be excluded
	<u>Data Fusion</u> <ul style="list-style-type: none"> · Ability to fuse multiple jurisdictions’ data and multiple modes’ data · Value-added information · Coupling with non-travel services 	<u>Data Fusion</u> <ul style="list-style-type: none"> · No official traveler advisory information · Decoupled with traffic management actions · Perception of using public funds in private operations
	<u>Data Dissemination</u> <ul style="list-style-type: none"> · Tailored information to meet various user needs · Market-driven dissemination technologies · Market-driven performance and credibility 	<u>Data Dissemination</u> <ul style="list-style-type: none"> · Basic and free-of-charge services may be dropped-quity issue · Insufficient infrastructure to serve en route users who have no in-vehicle equipment

3.5.1.2 Strength in Data Fusion

The strength of the public sector in performing data analysis and fusion may be examined from many aspects. First, the travel information provided can account for the government's transportation system management actions and advisory instructions when the needs arise. This represents an integrated approach to traffic and travel management. Second, the public sector owns the processed travel data and therefore has more flexibility in disseminating the data to private organizations. Third, projection and prediction of traffic conditions for proactive system management may also be used to support traveler information services (for example, in trip planning). Finally, the historical traffic and travel database maintained by public agencies for planning purposes can also be used in traveler information applications (for example, optimal route selection).

3.5.1.3 Strength in Data Dissemination

The strength of primarily public dissemination of traveler information is the available roadside information infrastructure, such as variable message signs and highway advisory radio. These means of information dissemination will continue to play an important role in the I-95 Corridor-wide Traveler Information System. The information provided to the travelers through public means is also free of charge and carries the inherent credibility of the public operating agencies.

3.5.2 Weaknesses of Primarily Public Implementations of Traveler Information Services

3.5.2.1 Weakness in Data Gathering

To support a comprehensive Corridor-wide Traveler Information System, transportation data over the entire road network need to be gathered. Although public resources are available today, or in the future, to gather surveillance information, they tend to concentrate along major roads where the needs for traffic incident and congestion management are more profound. Since full surveillance coverage will not be achieved in the Corridor in the foreseeable future, complete information to support all categories of traveler information services will not be available. Besides

the insufficient traffic surveillance coverage, operational status data of privately owned and operated transportation systems (for example, private subscription bus services and private parking facilities) will not be available to support completely services such as mode choice. Finally, the public sector is slow to adopt and implement emerging data gathering technologies compared to the private sector because of procurement and system implementation procedures.

3.5.2.2 Weakness in Data Fusion

Since the public sector has very well defined missions and responsibility, it would be difficult for a public agency to assume the role of a multijurisdictional and multimodal travel information integrator. Although many interagency institutional barriers within the I-95 Corridor Coalition have been overcome, the role of a multi-agency information integrator is so demanding that a new agency is essential (TRANSCOM is an example of this nontraditional role). Even if such an information integrator can be created, the ability to integrate data from multiple private sources is limited because of competition and conflict of interest concerns of the private sector. Finally, the ability of the public sector to provide a full range of traveler services information (for example, Yellow Pages-type information) would be limited because of the service sponsors' desire to advertise their products or services.

3.5.2.3 Weakness in Data Dissemination

A major weakness is the limited number of information dissemination methods that the public sector can use. This limitation stems from the fact that segments of the TIS market demand tailored information specific to the needs of a traveler or a business organization. Such information is usually disseminated to the users' personal devices, which may also be used to receive non-travel related information. The travel information demands of such market segments make it difficult for many public agencies to respond in a timely manner because of their mission and/or their limited revenue generation capability to recover the cost of providing the service.

3.5.3 Strengths of Primarily Private Implementations of Traveler Information Services

3.5.3.1 Strength in Data Gathering

The private sector can gather travel data from multiple jurisdictions as the market demands. The market demand also influences the types of technology to be used and the level of technology implemented. In this regard, the private sector can be more responsive to the market needs and can bring innovative solutions to gathering travel data.

3.5.3.2 Strength in Data Fusion

The profit-driven mission of the private sector allows it to establish easily private/private partnerships to integrate various types of information (cutting across multiple jurisdictions and multiple modes of transportation) needed to support a variety of traveler information services. This integration adds value to the collected information and can also incorporate non-travel-related information (for example, paging messages and fleet dispatches) to meet users' needs.

3.5.3.3 Strength in Data Dissemination

The key strength of travel information dissemination by the private sector is its ability to use a variety of dissemination methods depending on the market demand. The private sector can also tailor the information for individual customers. Because the private sector has to compete, its performance and credibility have to be satisfactory to the customer in order to stay in business. Thus, the public sector's occasionally expressed concern about the reliability of data collected by the private sector may not be an issue in an environment where the direct customer is the traveler.

3.5.4 Weaknesses of Primarily Private Implementations of Traveler Information Services

3.5.4.1 Weakness in Data Gathering

Without any cooperation from the public sector, the data gathering capability of the private sector is limited to traffic data that could be observed on the road. Thus, public transit status information would not be available, limiting the ability of the private sector to support multimodal traveler information services. Another weakness is that data supporting unprofitable services would not be collected (for example, in rural areas), creating gaps in the traveler information provided.

3.5.4.2 Weakness in Data Fusion

Although the private sector has much flexibility to integrate traffic and travel information across jurisdictional and modal boundaries, public agencies would be reluctant to let the private sector provide official advisory information to the travelers due to liability concerns. In addition, travel advisory information generated without the knowledge of traffic management actions being implemented or to be implemented would have limited effectiveness. Finally, without any public/private partnership arrangement, the private sector's use of publicly gathered data may be perceived as a misuse of public funds.

3.5.4.3 Weakness in Data Dissemination

Since the private sector's incentive in providing traveler information services is the expectation of profit, unprofitable services would not be provided. Because of this reason, there is a concern that basic or free-of-charge (to the end users) services may be eliminated, causing social inequity. Another weakness is that the private sector does not have sufficient en route information delivery mechanisms (for example, variable message signs and highway advisory radio) to serve people who cannot afford personal or in-vehicle communication devices.

3.5.5 Summary of Public/Private Partnership Needs Assessment

It has become evident that neither the primarily public nor the primarily private implementation option for traveler information services can effectively and fully meet the information needs of the travelers. Without any public/private partnership, a complete set of multijurisdictional and multimodal travel data cannot be created, and the full functionalities of traveler information cannot be provided. Public/private partnership arrangements are thus necessary to support fully the data gathering, data fusion, and data dissemination functions of a Corridor-wide Traveler Information System. The next section of this working paper addresses the public/private partnership opportunities for the traveler information services identified for this project, while Section 4 describes the recommended public/public partnership scenarios for implementing traveler information services in the Corridor.

3.6 PUBLIC/PRIVATE PARTNERSHIP OPPORTUNITIES IN TRAVELER INFORMATION SERVICES

This section addresses the opportunities for public/private partnering for the traveler information services identified for this project.

The results of Task I-Inventory of Traveler Information Services and Commercial Opportunities in the I-95 Corridor-of this project have revealed a number of information services that are relevant to the Corridor. These information services, combined with the public/private partnership needs assessment above, form a basis for identifying potential opportunities for public/private partnerships in traveler information services. In the following sections, each information service is briefly described and then the potential opportunities identified. Table 3-2 summarizes the traveler information functional areas in which potential public/private partnership opportunities exist. This analysis was done on a service-by-service basis. If services are combined, new opportunities for public/private partnership present themselves.

3.6.1 Real-time Incident and Congestion Summaries

This service provides accurate and up-to-date information on existing incidents in the Corridor-designated road network, including accidents, construction, weather conditions, system malfunctions, etc. Information includes the type of incident, location, severity, expected duration, expected delay, average operating speed, lanes blocked, alternate routes, etc.

The potential public/private partnership opportunities for this information service are mainly in the data gathering and data fusion. In data gathering, arrangements between the public sector and the private sector can be made to exchange data and avoid overlaps in data collection coverage. For example, if the public sector has already had service patrol along a stretch of roadway, the private sector may not need to spend resources to patrol the same stretch. However, where overlaps exist, each sector may use the other's data to confirm the occurrence of an incident, for example.

A partnership in data fusion may include arrangements in which the public sector is responsible for providing traveler advisory information (for example, detour routes) and making estimates of incident and congestion duration, expected delay, etc. The private sector, on the other hand, is responsible for integrating all incident and congestion data summaries for the entire region (covering multiple jurisdictions), and then disseminating the integrated information to participating agencies and to their customers.

A partnership in disseminating traffic incident and congestion information, in general, is not necessary because each sector uses its own delivery methods. A partnership, however, would be necessary at a "lower" level if one sector would require the use of the other's resources (for example, the right of way) for information dissemination.

Table 3-2. Potential public/private partnership opportunities in Corridor traveler information services

INFORMATION SERVICE CATEGORY	AREAS OF POTENTIAL PPP		
	Data Gathering	Data Fusion	Data Dissemination
1. Real-time incident/congestion summaries	High potential	High potential	Limited potential
2. Construction summaries	Public only	High potential	Limited potential
3. Real-time link status	High potential	High potential	Private only
4. Parking locations	Public only or private only	Public only or private only	High potential
5. Parking availability	High potential	High potential	High potential
6. Road weather conditions	Public only	High potential	Limited potential
7. Traveler advisories	Public only	High potential	Limited potential
8. Alternate routes	Private only ¹	High potential	Limited potential
9. Trip planning capability	Private only ¹	Private only ¹	Private only
10. Route guidance information	Private only ¹	Private only ¹	Private only
11. Road environmental conditions	Public only	Public only	Limited potential
12. Schedule, route, and fare information on all transit modes (bus, rail, air, and ferry)	Public only	Public only	High potential
13. Real-time status information on transit modes (bus, rail, air, and ferry)	Public only	High potential	High potential
14. Paratransit services	Public only	Public only	High potential
15. Ride-matching services	Public only	Public only	High potential
16. Traveler Accommodation information	Private only	Private only	Limited potential
17. Emergency Assistance Information	Private only	Private only	Limited potential
18. Tourist Attraction Information	Private only	Private only	High potential

‘Partnership needs to be established in supporting services (e.g., “real-time incident/congestion summaries” and “construction summaries”) but not in this particular service.

3.6.2 Construction Summaries

This service provides information on new, existing, and future construction activities within the Corridor. Information includes construction location, lanes blocked, duration, expected delay, alternate routes, etc. A potential public/private partnership opportunity for this service is in data fusion. The private sector may be responsible for fusing construction data from multiple public agencies and providing this information to the public sector in exchange for the use of the data in their private services. The public/private partnership opportunities in disseminating construction data summaries may be limited to those mass media in which the private sector may broadcast the information as a public service to its customers.

3.6.3 Real-time Link Status

This service provides real-time operational status of roadway links in the network. Status information is updated continuously (for example, on a minute-by-minute basis). The status of a given link normally reflects a level-of-service rating (for example, numerical or color-coded assignments) associated with a selected measure (for example, speed, volume, density, or travel time).

Potential public/private partnership opportunities to provide link status information are in data gathering and data fusion. In the short term (within two years), the private sector's capability to collect link traffic data may be limited because of the lack of traffic surveillance technologies and infrastructure. However, in the medium term and far term (beyond two years), the market for traveler information services and technologies for intelligent transportation systems are expected to be more mature, creating incentives for the private sector to invest in advanced surveillance technologies or to provide traffic surveillance services. Technologies such as cellular telephone tracking, "long-range" radar (approximately 6 miles), and airborne sensors are emerging and can be used to collect link status information.

The potential public/private partnership opportunities in data fusion center around the creation of a multijurisdictional network link status database. The private sector can serve as the information integrator and the distributor of the integrated data to participating public agencies in exchange for the commercial use of the integrated data.

3.6.4 Parking Locations

This service provides information on locations of parking garages and spaces for a given region. Since this type of information is “static” and can be easily collected and fused by either sector, no partnership is needed, only cooperation. The dissemination of parking location information to en route drivers, however, requires a public/private partnership to be established because a private parking location service provider may need to use the public sector’s right-of-way or roadside information delivery devices such as variable message signs or highway advisory radio to direct drivers to parking facilities.

3.6.5 Parking Availability

This service provides real-time parking availability information (for example, number of parking spaces left in a certain garage) along with fee information and other parking restrictions such as high-occupancy vehicle requirements (in support of implementing a travel demand management policy). Potential public/private partnership opportunities for this service span all three traveler information functions: data gathering, data fusion, and data dissemination.

For data gathering, there may be opportunities for the private sector to furnish and operate parking occupancy monitoring equipment. The data collected will not only provide data for this service but, more importantly, help parking operators (either public or private) to enhance their management activities. The data fusion opportunities are in the integration of information from public and private parking facilities region-wide. Finally, public/private partnership opportunities in data dissemination are in the collaboration between the two sectors to serve en route drivers.

3.6.6 Road Weather Condition

This service provides weather information relevant to the roadway system. Information can include current road surface conditions (for example, wet, icy, snow accumulation), driving visibility conditions, and current and forecast area or regional weather conditions. Since road weather condition information is usually collected by the public sector for snow removal and deicing operations, potential public/private partnership opportunities for collecting such data do not seem

to exist. However, public/private partnership opportunities to integrate road weather information across jurisdictional boundaries are possible. The public/private partnership to disseminate road weather information does not seem necessary because each sector can use its own assets to deliver the information to its customers. However, cooperation opportunities may exist for the private sector to broadcast the information as a public service to its customers.

3.6.7 Travel Advisories

Travel advisory information usually includes warnings based on the conditions of the roadway system. Advisory information is expected to be acted on by the travelers to avoid hazardous (safety related) or undesirable (congestion related) driving conditions. Travel advisory information must be generated by the public sector and therefore no potential public/private partnership opportunities exist. The potential public/private partnership opportunities for integrating travel advisory information across jurisdictional boundaries and for disseminating this information to the travelers are possible. The PPP for travel advisory information dissemination, however, should be considered as a public service provided by the private sector.

3.6.8 Alternate Routes

This service provides information to users regarding alternate routes to arrive at a given destination. The alternate route is provided to avoid delays due to abnormal road or traffic conditions. Because the determination of alternate routes depends on traffic conditions data and the collection of which may be through a public/private partnership, it would be repetitive to consider public/private partnership opportunities for data gathering in this case. Similarly, the public/private partnership opportunities for data fusion would not be considered except that such partnerships would ensure the consistency in alternate route determination. For alternate route data dissemination, no public/private partnership seems necessary, but cooperation opportunities may exist for the private sector to broadcast the information as a public service to its customers.

3.6.9 Trip Planning Capability

This service provides detailed information to assist a traveler to select the desired travel mode, departure time, and route. A trip plan is generated based on the user's specified origin, destination, desired departure and arrival times, modal preferences, and constraints (for example, cost, walking distance, and special accommodation such as wheel chair). The generated plan should also account for the projected traffic and weather conditions during the time the trip is made.

Trip planning information may be provided as a basic, free-of-charge service. In this case a public/private partnership may be established to disseminate more widely the information (for example, through cable TV). In the case where trip planning is provided as a personalized travel service, this service would be entirely operated by the private sector, consequently requiring no public/private partnership.

3.6.10 Route Guidance

This service generates navigation instructions to help the driver follow a selected route to his/her desired destination. This service may be coupled with a trip planning service to generate the most desirable route based on the traveler-provided criteria and constraints. Current traffic conditions, traveler's preferences, and weather conditions are taken into consideration in determining the route and the route guidance instructions. Since route guidance is a personalized service and serves only a portion of the population that is willing to pay for the service, it should be provided by the private sector and therefore no public/private partnership opportunities are considered.

3.6.11 Road-specific Environmental Conditions

This service provides environmental information relevant to the roadway system. Information can include current levels of carbon monoxide, nitrogen oxide, or particulates. The fusion of this type of information is usually performed by a government agency (for example, the U.S. Environmental Protection Agency); therefore no public/private partnership is needed. Because this service aims

at the protection of public health and the preservation of air quality, public/private partnership opportunities exist for information dissemination as a public service.

3.6.12 Static Bus, Rail, Ferrv. and Air Data

This service provides static information on bus, rail, ferry, and air transportation modes. Static information does not change very frequently and includes such information as schedules, routes, fares, stops, hours of operation, and instructions on how to access and use the transportation system. Potential public/private partnership opportunities exist only in data dissemination because data gathering and data fusion can be performed by either the public sector or the private sector.

3.6.13 Real-time Bus, Rail, Ferry, and Air Data

This service provides real-time operational status information on bus, rail, ferry, and air transportation mode. Real-time information can include vehicle location, expected times of arrival and departure, seating availability, etc. Because the real-time information of each mode is collected by the respective operator of the system, no public/private partnership is necessary in this function. To integrate the information of all modes and widely disseminate the integrated information to the users, public/private partnership opportunities exist. The integration of multimodal data offers an opportunity for the travelers to make informed mode choice decisions, including that of the use of an automobile.

3.6.14 Paratransit Service Information

Paratransit in the strictest sense is a "modified transit" service. This mode of transportation includes carpooling, vanpooling, subscription bus, limousine service, taxi service, etc. The primary purpose of paratransit is to support travel needs that cannot be satisfied through traditional fixed-route public transportation. Paratransit service information is mostly static and therefore can be easily gathered and/or supplied by the service providers. No PPP is necessary for data gathering or data fusion. Opportunities for partnership, however, exist for data

dissemination using public and private information delivery mechanisms to promote the availability of those services in a region.

3.6.15 Ride-matching

This service identifies potential matches from a database of travelers for potential carpools or vanpools. Matches are based on individual travelers' needs such as locations of trip end, times to travel, special access requirements, etc. Opportunities for public/private partnership in providing ride-matching *information* are limited to only data dissemination because the other two functions (data gathering and data fusion) can be performed by either sector.

3.6.16 Traveler Accommodation Information

This service provides lodging, food, and fuel service information. This information contains the location of, directions to, and hours of operation of these accommodations. It can also include advertisement information such as rate, availability, special offers, and so on that the service providers may want to communicate to the travelers. Furthermore, the system that provides traveler accommodation information may also offer a capability for the traveler to make reservations for such services.

A public/private partnership does not seem to be necessary in providing traveler accommodation information. The public sector has provided the basic accommodation information through static signs. The private sector may provide value-added services to the travelers and the service providers through its own initiatives. The only potential public/private partnership opportunities are in the dissemination of traveler accommodation information at rest stops, major mass transit stations (bus, rail, and air), or other facilities owned by the public sector.

3.6.17 Emergency Assistance Information

This service provides information to help travelers to receive emergency assistance. This type of information includes location of hospitals, police, vehicle repair shops, and possibly emergency

telephones. As in the traveler accommodation information service discussed earlier, some public/private partnership opportunities exist for information dissemination at public transportation facilities.

3.6.18 Tourist Attraction Information

This service provides tourist attraction information such as special events (sport, cultural, arts, etc.), historic sites and land marks, park and recreational facilities, educational institutions, resorts, and so on. The collection and fusion of these data items require only public/private cooperation and may be performed by either sector. Opportunities for PPP, however, exist in data dissemination. Such partnerships are likely with public agencies that are responsible for economic development in their region.

3.7 EXISTING AND PROSPECTIVE PUBLIC/PRIVATE PARTNERSHIPS

This section will discuss the various types of public/private partnerships (PPPs) taking place in the US., as well as Europe and Japan. For each PPP, an overview and in cases where applicable, a description of the elements of the partnership agreement will be specified.

3.7.1 Public/Private Partnerships in the U.S.

According to the partnership definition provided in Section 2.2, few true ITS public/private partnerships exist in the U.S. In most cases, existing “partnerships” are informal working relationships or verbal cooperative agreements. There are, however, by a loose interpretation, many partnerships in the U.S. with varying levels of formality, cooperation, coordination, communication, and sharing in terms of resources (people, assets), risks, revenues, profits and expenditures. This section will summarize the different types of partnerships currently in place, using the following framework:

+ informal working relationships

- cooperative agreements
- + field operational tests (FOTs)
- + innovative entrepreneurial startups

3.7.1.1 Informal Working Relationships

Informal working relationships are prevalent in the ITS community. The characteristics of these types of relationships are that there is no written agreement, communications and cooperation are normally verbal and are performed on a goodwill basis, there is no exchange of money or sharing of risks, and the relationships are typically not jointly governed. These types of informal relationships are normally beneficial to both firms and prosper from unique one-on-one personal relationships. Moreover, because of the lack of formal agreements, no official rules of engagement that define responsibilities are identified.

The following are examples of these types of relationships:¹

- + Commercial Traffic Reporting Firms and Public Agencies-in many areas of the country, companies such as Metro Traffic Networks and Shadow Broadcast Services on a goodwill basis provide incident information over the telephone to public agencies. In some areas, members of police departments ride in commercial traffic reporting firm aircraft and report information to ground recipients. The information flow is not just one-way, because the public agencies also provide construction and incident reports to these private companies, so that information can be broadcast to the public for free. This model, in our view, is not a true partnership. If, however, there was formalized exchange, sharing of control and either or both of the partners were to provide, operate and maintain, at their own costs, an electronic information exchange capability for incident information exchange, this would be considered more of a true partnership.

¹ These examples are intended to be representative and not comprehensive.

- + Good Samaritan Programs and Public Agencies-Samaritania is a for-profit company that provides a freeway service patrol for private-sector sponsors² in areas where congestion and market sponsors exist. Samaritania's main function is to provide free motorist assist vans to support disabled vehicles. Vans display sponsor names (for example, CVS) and are equipped with push bumpers, two-way police radios, mobile phones, air pressure tanks for tires, spare gasoline, spare oil, engine belts and multi-talented crew members. Crew members have basic mechanical skills and are emergency medical technicians who carry oxygen tanks, trauma kits, and state-of-the-art equipment. In addition to providing assistance to needy motorists, crew members work with various agencies to report incidents. For severe accidents, police are notified via a dedicated two-way radio. The traffic operations center typically is notified indirectly through operators listening with police scanners. In some cases, where Samaritania has formed relationships, radio stations are directly notified. In terms of costs, each van requires about \$100,000/year to operate, including crew salaries. The overall program is quite innovative and benefits all parties. The private-sector sponsors benefit mainly through enhancement of their public image. Many stranded motorists who receive free service promise their loyalty to that sponsor. Public agencies benefit through disabled vehicle assistance and removal, road debris removal, incident reports and clearance assistance. Assistance in these areas helps public agencies meet their goals by increasing safety and minimizing the results of secondary congestion.
- + Other Information Barriers-in some cities, public agencies have developed relationships with various other private sector partners (for example, commercial vehicle fleets), where incident information is exchanged.

3.7.1.2 Cooperative Agreements

Cooperative Research and Development Agreements (CRDA) are modeled after national laboratories and private industry that provide incentives for private participation research efforts, such as joint ownership of resultant intellectual property (for example, patents). In the ITS community many R&D contracts are modeled after the CRDA program, where universities,

² Samaritania in some areas of the country (e.g., Boston) also receives public funding to extend their services and subsidize their operations-resulting in co-funded operations. Under these circumstances, the relationship is more formal and therefore more of a true partnership since formal agreements and sharing of costs and benefits exist. For public agencies, this results in a significant savings, since the net cost is much lower than it would be to provide the service themselves. These types of co-funded operations may become more prevalent in the future, since there is a National Highway System bill now before Congress that will enable public-funds provided for co-funded operations to be eligible for federal match.

national laboratories, private industry, and federal, state and local governments form a consortium to pursue joint R&D goals. These may include cost-share or joint R&D programs such as the ITS IDEA Program or the ITS Research Centers of Excellence, that require matching funds from private industry. One of the largest ITS cooperative agreements is the National Automated Highway System Consortium, which is partnering with the private industry, national laboratories, universities, national, state, and local transportation agencies to develop alternative automated highway system concepts.

3.7.1.3 Field Operational Tests (FOTs)

Most FOTs in the U.S. are considered to be partnerships, since they are procured under partnership agreements negotiated by federal, state, and local governments as well as private and educational institutions. Each of the participants in the FOT is viewed as a partner, since each shares in funding (either directly through monetary contributions, or indirectly through donations of labor or products/services) and therefore risk. There are many FOTs in the U.S.: the following are a sample of relevant ATIS FOTs:

- + **Seattle Wide-area Information for Travelers (SWIFT)**-The major functions of the FOT are to collect regional traveler information from Metro Traffic Networks, Washington Department of Transportation, and other public agencies; to integrate and fuse the data; and distribute the data to a limited number of users, utilizing Seiko Message Watches, Delco in-vehicle navigation devices, and IBM PC portables. The dissemination of this information involves the use of Seiko's wireless FM subcarrier High Speed Data System. An interesting element of the partnership is that each of the 6 partners has an equal say (i.e., 1 vote/partner) in all decisions, regardless of cost share contributions and percentages of overall workload. Details of revenue sharing are not specified in the FOT, however, many of the partners have discussed a strategy on how to deal with this issue.
- + **SmarTraveler**-The SmarTraveler Regional Advanced Traveler Information System is a public/private partnership between the Massachusetts Department of Transportation (MADOT) and SmartRoute Systems (SRS)-a private company located in Cambridge, Massachusetts. One of the objectives of the agreement between MADOT and SRS states both parties' intentions to "refine a model which optimizes private sector participation in the delivery of traffic and transit information."

The SmarTraveler public/private partnership agreement has both cost and revenue sharing elements. Cost-sharing is specified in the agreement with SRS being required to match 80% of the cost of the MADOT contract with additional public and private sector contributions to the SmarTraveler program. These contributions are primarily in the area of marketing and provide wider exposure to the SmarTraveler service than would be possible under the MADOT contract. Revenue-sharing is also addressed in the agreement with net incremental revenues from new services being divided between the public and private sectors evenly. MADOT decided to apply any revenues they would receive from this provision to expanded services. SRS is currently designing a public-place kiosk program for MADOT to be implemented through this provision. The SmarTraveler service was initially an FHWA field operational test, and was recently extended by MADOT for a three-year period. The SmarTraveler service provides up-to-the-minute traffic and transit information through an audiotex delivery mechanism using landline and cellular phones.

- + **Advanced Driver and Vehicle Advisory Navigation Concept (ADVANCE)**-This is an FOT in Chicago, Illinois, that will evaluate the performance of the first large-scale dynamic route guidance system in the U.S. Approximately 5000 private vehicles in the northwestern suburbs of Chicago will be equipped with in-vehicle navigation and route guidance systems. The vehicles in the FOT will act as probes, providing real-time traffic information to a Traffic Information Center. The information in the center is then processed and transmitted to the equipped vehicles and used to develop and display a recommended route. Project partners include Illinois Department of Transportation, Motorola, Illinois Universities Transportation Research Consortium, and FHWA.
- + **TravInfo**-The TravInfo project will implement a comprehensive, region-wide traveler information system for the San Francisco Bay area. The system will provide both pre-trip and en-route multimodal information disseminated through a Traveler Advisory Telephone System and a wireless in-vehicle Data Broadcast System. In addition, the TravInfo architecture will provide open-access to the data so that various value-added resellers can tap in and disseminate more personalized traveler information. TravInfo partners include TRW, Etak, CalTrans, FHWA and the Metropolitan Transportation Commission.
- + **Genesis**-This FOT is testing and evaluating the value of a personal digital assistant (PDA) in providing travelers with real-time, route-specific information on operating conditions of highways and mass transit systems, along with packaging techniques to

bundle other types of personal-use information. Information is disseminated to laptops, PDAs, and one-way and two-way pagers. Partners include Loral, FHWA, JHK, MnDOT, Motorola, Center for Transportation Studies, and the University of Minnesota.

- + Travlink-The Travlink system is an operational test of an advanced public transportation system. The system distributes real-time and static transit and traffic information in order to encourage commuters to consider alternatives to single-occupancy vehicles. The system's primary objective is to determine the influence of improved information on travel behavior. Other objectives are to improve fleet management for better on-time performance, to provide better incident management, and to increase security for transit passengers and bus drivers. Partners include Westinghouse, MnDOT, Regional Transit Board, US West, 3M/Renix, City of Minneapolis, University of Minnesota, and FHWA.
- + Atlanta Traveler Information Showcase-During the summer of the '96 Olympics, this project will provide traveler information to the public, enabling them to make informed travel decisions. Transit schedules, incident notifications, and route alternatives will be available on a computer in a car, on a hand-held computer that serves as a personal communication device, on interactive television in hotel rooms, from on-line services at work and home, and on cable television. Also, information about restaurants, hospitals, hotels, and emergency services will be made available in a similar fashion. Project partners include Battelle, TRW, JHK, SRC, Walcoff and Associates, BRW, FHWA, the Georgia Department of Transportation, the Metropolitan Atlanta Regional Transit Authority, and the Federal Transit Administration.

3.7.1.4 Innovative, Entrepreneurial PPPs

Even though ITS deployments are still in their infancy, many innovative public/private sector partnerships are underway. These partnerships are typically conceived by small start-up companies or by innovative groups within larger companies. Examples of these types of partnerships include the following:

- + Discover America-The Discover America InfoCenter Program was launched by the State and Territorial Tourism Offices in cooperation with the USA Marketing

Council. Kiosks were placed in rest areas, welcome centers, restaurants, airports, malls, and other public areas around the country. Users can access information regarding weather and road reports (for areas where it is available), buy tickets to sporting events and concerts or send post cards to relatives. Most travel information provided on the kiosks is free to end-users. In addition, the costs of the kiosks is free to the host facility, provided ample market sponsors are available. If not, the host facility and Discover America may chose to enter into an agreement where the capital, operations, and maintenance costs of the kiosks are shared, as are any revenues.

- + Maxwell Laboratories-Delivery of traveler information through the World Wide Web (WWW)/Mosaic is an emerging technology making various types of traveler information available through the Internet. Maxwell Laboratories in conjunction with many public agencies and commercial traffic reporting firms across the country are teaming up to provide real-time traveler information to Internet users. The WWW service provides a graphic display mapping the region's main highways with color-coded vehicle speed and congestion information. In addition, various other types of information may be obtained, such as weather reports, transit schedules, beach forecasts, video-snapshots, incident and construction reports, and raw sensor data. Currently, these services are subsidized by public funds. Maxwell Laboratories, however, is anticipating a self-sustaining business in the future.
- + Telephone Communication Companies and Public Agencies-In some areas of the country telephone companies are partnering with state agencies to install fiber optic backbones. The typical relationship is for common carriers to install and maintain the fiber and associated equipment in exchange for right-of-way access.

3.7.2 Public/Private Partnerships in Europe and Japan

For the purposes of this paper, several major European ITS efforts were investigated. For each PPP, an overview and in cases where applicable, a description of the elements of the partnership agreement will be specified.

- + Dedicated Road Infrastructures for Vehicle Safety in Europe (DRIVE)-This is a large European program that is developing standards and providing hardware, software, and communication infrastructures required to support both ATMS and ATIS. A two phase program, DRIVE I focused on the pre-

deployment, research and development aspects, while DRIVE II focused on field trials and implementation. The ATIS aspect of the DRIVE II program is aimed at providing dynamic road information to in-vehicle driver systems. The DRIVE program is unique for several reasons. First, this program provides a distributed national Traffic Information Center (TIC) database, which is run by the Automobile Associations (AA) Roadwatch service, which provides the only publicly available road traffic database for the United Kingdom. The AA Roadwatch, which originally started as an operation similar to a Metro Traffic Networks operation (i.e., private surveillance, scanners and trained radio broadcasters) in the U.S., has now evolved into more of a public/private/user partnership with nine regional Roadwatch centers located around the major cities in the U.K. Data is now collected from local, regional and roadway police, AA patrols and staff, local authorities, public utility companies, registered car phone users, TrafficMaster (a privately-owned real time road traffic information service), and event organizers. The second interesting aspect of the DRIVE program is the unique public/private partnership that is utilized to collect, process and disseminate information to travelers. In most cases, private partners only receive 50% of the required funding and are able to retain any intellectual property rights. Information to travelers is disseminated in two fashions, broadcast and on-request. Broadcast information is disseminated via radio stations (from broadcasters in AA Roadwatch studios), direct TIC database access or fax to other TV/radio stations providing traffic news, teletext, paging, and public kiosks in malls and road service areas. On-request information is provided via recorded telephone messages, AA Information Centers operators, computer bulletin-board services, and Traffic Master. Finally, maybe the most unique aspect of the DRIVE program is the emphasis being placed on incorporating the drivers point of view. The project has focused on delivering information that the driver needs, and not necessarily trying to control which routes are used.

- + Two related programs in Europe are the Mediterranean-Lyon-Stuttgart (MELYSSA) and the Program for European Traffic with Highest Efficiency and Unprecedented Safety (PROMETHEUS). MELYSSA, one of the largest projects, about \$17 million, is an integrated ATMS/ATIS. This project receives very substantial financial support in terms of transport infrastructure and consulting services from private sector partners (similar to DRIVE II around 50%), mainly French and German automobile, aerospace and engineering companies. PROMETHEUS is a research and development project (similar to DRIVE I), but is sponsored by the private sector and subsidized by public funding. PROMETHEUS's industry and research partners are attempting to define a single integrated information and control system that utilizes

emerging technology and public/private partnerships. Joint field trials are currently being conducted under this program.

- + Vehicle Information and Communication System (VICS), Advanced Mobile Traffic Information and Communications System, Advanced Road Telecommunications System, and Road Automobile Communications System-These are Japan's ITS components that correspond to most of the U.S.'s ATIS functions. The Japanese approach to partnerships has been implemented on a much larger scale. A large private sector consortia, consisting of automobile manufacturers, private sector ATIS collectors and disseminators and engineering firms is utilized. The private-sector firms provide a substantial portion of the funding and also have intellectual rights protected on any ITS by-product. Although it can be argued that the Japanese approach to ATIS is far more mature and superior than other countries' ITS, there are currently unresolved issues, particularly in VICS, relating to operating revenues and expenditures. Work is currently being performed to ensure that adequate operating revenues are available to equitably satisfy all partners. A final interesting element of the partnership is a "codes of practice" agreement that is utilized by all partners. This defines and provides guidelines for various areas that private firms are concerned about (for example, liability).

3.7.3 Agreement Language

This section will present a summary of the agreement language obtained for existing ITS public/private partnerships identified in Section 3.7.1, the majority of which are ATIS FOTs.

Many of the agreements obtained for this task share common elements, some of which are simply place holders for nebulous areas (pending outcomes of FOTs), some of which are fully defined, and some of which are not defined at all. The obtained model agreements varied from formal, legalized separately bound documents to extended scopes of work that specifically clarify partnership issues. Table 3-3 summarizes content of the obtained model agreements.

Table 3-3

Summary of agreement language

Partnership Consideration	Level of Clarification
Intellectual Property-Data Rights-Ownership, Usage, Exclusivity	none
Intellectual Property-Software, Hardware-Rights on Patents, Copyrights Ownership, Usage, Exclusivity	most
Intellectual Property-Document Rights-Ownership, Usage, Exclusivity	most
Cost Sharing-apital costs, labor costs, O&M costs	some
Revenue/Profit Sharing	none (some place holders)
Special Usage Rights	some

4 . SCENARIOS OF PUBLIC/PRIVATE PARTNERING

This section describes the scenarios we think are likely for public/private partnerships in the provision of traveler information.

4.1 SCENARIOS OF HIGH-LEVEL INSTITUTIONAL STRUCTURE

In this section, we identify and discuss four specific scenarios for structuring public/private relationships for the provision of traveler information within the Corridor Coalition project area.

Each of these scenarios has numerous sub-options for the partnership structure and procurement approach to implement it. Many of these sub-options are discussed herein, but others are possible as a scenario becomes more developed and nears implementation. Scenario 2, for example, may require a “systems manager” partner to assist the Coalition in data fusion and in administering the multiple public/private partnerships resulting from this approach.

Each scenario also has a different set of potential partners or team of partners, depending on the functions to be provided by the private sector. Scenario 1, for example, would obviously require a very large and diverse company or team, while Scenarios 0 and 2 may represent the widest possible spectrum of partnership opportunities.

Each scenario is discussed below beginning with a scenario description, followed by an evaluation of the implementation potential of the scenario, its ability to meet public and private objectives for a partnership, the likely procurement methods and models for the partnership, and some of the sub-options that exist for organization and procurement.

4.1.1 Scenario 0-No Special Institutional Structure for Corridor-wide Traveler Information

4.1 .1 .1 Description

In this scenario, the current organizational and institutional structure in the Corridor persists, and there is no centralized collection and fusion of public-agency data, no regional traffic information centers, etc. The Corridor would not create traveler information centers, would not enter into Corridor-level public/private partnerships, and would not embark on a program to create multi-jurisdictional agencies to collect and fuse traveler information.

This does not mean that traveler information will be left to its own devices. In this scenario, the member agencies of the Corridor, and other important agencies (for example, police forces) would:

As a matter of policy, make traveler information available to private-sector entities in return, typically, for recovery of incremental costs.

Work to standardize outputs, so that private firms can use standard interfaces across the Corridor.

4.1 .1 .2 Implementation Policy

This scenario would not roll out traveler information as quickly, coherently, or smoothly as the other scenarios. However, in our view, private-sector commercial traffic reporting firms would find the scenario congenial, and would expand their offerings as agencies made the information available.

4.1 .1.3 Ability to Meet Public and Private Objectives

As discussed above, it could not be assured that public objectives would be met quickly, coherently, or smoothly as with other scenarios. However, if agencies work toward making information available in a ready fashion, public objectives that were also commercially viable would be met. Non-commercial objectives-for example, making intermodal information available to motorists-would not be met without the public sector's establishing their own agencies.

4.1.2 Scenario 1-Corridor-wide Traveler Information Service Provided Through a Single Public/Private Partnership

4.1.2.1 Description

This scenario would involve the collection (from traffic operations centers, transit properties, etc.), management, fusion, and dissemination of information by a single partner (or team) for the entire Corridor.

The private partner would be responsible for collecting existing data from current and future public and private surveillance installations throughout the Corridor; adding supplementary sources of data collection where necessary; fusing the data into an integrated, accessible database; and disseminating the data to various end users.

The private partner would either directly disseminate or contract with other private firms to disseminate traveler information through various channels-such as pagers, commercial radio, kiosks, and telephone.

4.1.2.2 Implementation Potential

A corridor-wide public/private partnership would be among the easiest to implement from an administrative point of view. With the possible exception of Scenario 0, this option is the most centralized and easiest to manage from the Coalition's perspective.

There may be some difficulty in implementing this option due to the size of the undertaking. A corridor-wide TIS partnership would, by definition, be a huge undertaking for the selected partner. Our discussions with potential private sector partners indicated that this option was viewed by many of them as unworkable given its scope and the number of parties involved.

4.1 .2.3 Ability to Meet Public and Private Objectives

Scenario 1 does have the ability to meet the objectives of public sector partners as described earlier in this report.

This option is large enough from a potential revenue point of view, to allow capital investment on the part of the private sector; given the right type of arrangement with the public sector. There are also opportunities to apply specific expertise not available in the public sector to this scenario, particularly in the systems integration and communications area.

This scenario does require a different management approach than normally taken with respect to transportation projects. Obviously the interaction of one private partner with numerous public agencies and authorities necessitates a skillful, coordinated approach to this effort from both sectors.

Finally, the public sector objective of lower operating costs is well served by this option due to its strongly centralized operations and presumably resulting economies of scale.

4.1.2.4 Procurement Options

This scenario lends itself to several different types of procurement for the partnership:

Request for partnership proposals. This procurement approach would involve a solicitation to the private sector at large seeking proposals on how to structure a partnership for a corridor-wide traveler information system. An RFPP would require the potential private partners to detail their approach to a partnership, leaving to them the intricacies of the operation and its financing.

This procurement option-unlike the design, build, operate one-would result in a varied set of proposals for accomplishing the overall objectives.

One key to this type of procurement is that the public sector has a clear and stated method for evaluating the proposals. RFPPs are generally believed to be the best way to tap the private sector's creativity in approaching public/private partnerships, and are growing in acceptance as a procurement option.

Design, build, operate. This procurement option for designing and deploying the Corridor-wide Traveler Information System would put all of the responsibility on the private partner to plan, design, and implement the system to specifications or performance criteria developed by the public partner.

Financial arrangements for such an option could be varied. On one extreme, the public sector could simply exchange the rights to build and operate the system for the rights to the revenues from the system, which would accrue to the private partner. At the other extreme, a design, build, operate procurement could explicitly detail the allocations of costs and revenues to the respective public and private partners.

Franchise agreement. A franchise is a special privilege conferred by the government on a private party, and typically involves the use of public assets by the private party in a business pursuit. Advanced traveler information services can fall within this definition.

A franchise agreement for the provision of traveler information services for the I-95 Corridor would probably grant the private-sector partner the right to government-owned and -controlled infrastructure (i.e., traffic operations centers, CCTV images, etc.) in exchange for certain services desired by the public sector. These services could include the provision (at reduced or no cost) of traveler information to the general public by widely accessible means.

Franchises generally grant exclusive rights to the information or facilities they identify, which may be problematic in some locations.

4.1.3 Scenario 2-Corridor-wide Traveler Information System Management Provided by Corridor Coalition: Dissemination to End Users Provided Through Public/Private Partnerships

4.1.3.1 Description

This scenario would invest the collection and fusion of the data in the public sector and provide for dissemination of the already fused data through private sector partners. This option would provide the I-95 Corridor Coalition with continued control of the information database, but would require investment on the Coalition's part in designing a data fusion system that would have the capacity to serve an unlimited number of private sector partners who would seek access to the fused data.

4.1.3.2 Implementation Potential

The implementation potential of this option is impacted by the roles identified for the public and private sectors. Under this scenario, implementation would take place in two distinct phases with the public sector retaining the role of data collection and fusion, and the private sector handling all dissemination, with the possible exception of variable message signs and highway advisory radio.

Retention of the data collection and fusion function by the public sector addresses some of the issues regularly raised about the ownership of data used to develop traveler information systems. On the other hand, public-sector agencies are not as experienced in data fusion systems as the private sector, and may have some difficulty in accomplishing this task in a timely manner. Additionally, the private sector does not generally have the expertise to fuse the data in a way that will be useful to value-added resellers and other information providers. From the private sector's perspective, this option could have a high potential for implementation-if the above issues are adequately addressed by the public sector.

4.1 .3.3 Ability to Meet Public and Private Objectives

This scenario does not go as far in meeting the public sector objectives as do Scenarios 1 and 3. With the public sector taking on the role of data fusion, there is less need for capital investment on the part of the private sector. Also, the provision of this function by the public sector reduces the ability of the public sector to obtain the generally lower operating costs of the private sector.

Speed of deployment is also probably slower than Scenario 1 or 3 given the relative abilities of the public and private sectors to quickly complete the data fusion function.

This option does allow the private sector to apply their special expertise to the dissemination tasks of the TIS, and lower operating costs.

The private sector's objectives are well met by this scenario in the areas of access to transportation infrastructure (the fused database) and the transportation regulatory agency defining the market. Eminent domain and fiscal power do not impact on this option.

4.1.3.4 Procurement Options

This scenario also has several different procurement options that could apply to it.

Franchise agreements. Scenario 2 lends itself to franchising because of the presumed value of the information resulting from the public sector's data fusion role in this model. As mentioned earlier, franchises typically grant exclusive rights to the government's property-in this case, the traveler information database-in exchange for a fee or some other consideration.

Under this option, the public sector could set up a competitive process to grant multiple franchises to different types of information providers. For example, there might be one franchise for an audiotex system, one for in-vehicle devices and another for on-line services. Companies wishing to compete for the franchises would submit proposals.

Requests for partnership proposals. This procurement model would leave more discretion to the private-sector partners than the franchise method. Here, the public sector would announce the goals of their procurement (i.e., widely disseminated traffic and transit information for pre-trip and en-route services), and the private sector would respond with an approach to accomplish those goals and to accomplish their own objectives of profitability.

An RFPP for this scenario could take many forms-from one similar to the franchise approach where each disseminator is a separate partner, to a more coordinated approach grouping several types of dissemination within one partnership. The private-sector partners would determine through their own knowledge and experience which approach to propose.

Auction. The value-added process undertaken by the public sector in the fusion of the data under this scenario may make a government auction a possible procurement method for Scenario 2. One benefit of an auction may be to "price" the value of traveler information, which is now totally unknown.

One drawback of the auction option from the public sector's viewpoint would be the relative lack of control of the winner of the process, and of the services they may seek to implement. This process would not allow the public sector maximum leverage in achieving public-policy objectives.

4.1.4 Scenario 3-The Creation of a Few to Several Public/Private Partnerships on a Regional Basis to Collect, Manage, and Disseminate Traveler Information Within Their Respective Regions

4.1.4.1 Description

This approach would identify four or five regions within the I-95 Corridor from Maine to Virginia (for example; Boston, New York, Philadelphia, Baltimore-Washington, and Richmond), and seek one public/private partnership for each region.

The private sector would be responsible for data gathering, data fusion and dissemination in the region for which they are selected. Dissemination could be done through the regional public/private partnership or through public/private partnerships between the regional partnerships and individual disseminators.

4.1.4.2 Implementation Potential

This scenario rates highly on implementation potential. Since it involves all of the functions, there is no need for the public sector to perform the data fusion effort, and since it is not Corridor-wide, the likelihood of its being too big for potential private partners to pursue is greatly diminished.

Many potential private sector partners identified this as their preferred scenario for implementation. Some of the reasons given in these interviews were: "This is the best option. It's reasonable in size and scope;" and "Best scenario because it fits with commuter travel patterns."

4.1 .4.3 Ability to Meet Public and Private Objectives

Scenario 3 has the ability to meet public and private objectives. Each regional operation would be of sufficient size to encourage capital investment on the part of the private sector. Also, given the manageable size of each partnership, speed of deployment should be fairly quick, at least for one or more of the regions. Combining the three major functions into the private sector role (data gathering, data fusion, and data dissemination) will allow for private sector partners to utilize special expertise in these functions, hopefully resulting in lower operating costs.

This scenario also meets the private-sector objectives of access to government infrastructure, and-depending upon the procurement option chosen-a favorable regulatory environment.

4.1.4.4 Procurement Options

Scenario 3 and Scenario 1 are both suited to the same procurement options

Design, build, operate. The procurement option to design, build, and operate a public/private partnership for regional traveler information services would solicit, subject to design and performance criteria set by the public sector, a private partner with the responsibility to plan and implement the system.

Similar to Scenario 1, this option could have varied financial terms mixing levels of service with cost- and revenue-sharing arrangements.

Request for partnership proposals. As mentioned earlier, the RFPP approach is generally believed to be the best way to tap the private sector's creativity in designing the service and partnership models for a public/private partnership. For this scenario, it also has the benefit of allowing for solutions that meet a particular region's specialized needs in meeting the public sector's objectives.

Franchise agreements. Franchising is also applicable to this scenario, offering regional franchises to provide these services. These franchises can be revenue generating or cost neutral to the public sector, depending on the potential marketability and profitability of the expected franchise.

4.2 SCENARIOS OF LOW-LEVEL INSTITUTIONAL STRUCTURE

This section sets out a scenario of how traveler information partnerships might be structured for the dissemination of traveler information from the regional centers to end users. It is our view that each low-level partnership will be unique, based on the proposed service's technology, market, and commercial attractiveness. Indeed, we believe that public/private partnerships that conform to the primary definition given in Section 2.2 may be somewhat rare in practice.

In order to exemplify the kind of public/private partnerships we believe may be appropriate below the level of the regional information centers, we set out a scenario for the dissemination of personalized traveler information, an area that research by Project 6 and others shows may be commercially viable.

4.2.1 The Business Proposition

A private firm believes it can develop a profitable market for personalized and timely traveler information available through in-vehicle devices. The end user typically would request an origin-to-destination routing, or would register his daily commute route and times. In both cases, the user would receive updates and advisories of incidents, construction, and the like along the registered route, together with offers to reroute around serious problems.

4.2.2 The Public Interest

Merely providing motorists with better information about routes improves their utilization of the transportation infrastructure. However, public-policy goals include reducing motor transport use

(and thus mitigating pollution, improving safety, etc.) by moving trips out of the highway mode and into more energy-efficient modes.

4.2.3 The Structure

The purest arrangement would have the private firm “buying” rights to the regional traveler information database on a continuous basis. That is, the RTIC would download all new information (i.e., transactions to the database) that fall outside certain thresholds. The private firm would probably maintain its own machine-readable maps and routing engine. Information flow would generally be one way, from RTIC to disseminator, though the private firm might post requests for unusual or interregional information.

4.2.3.1 On a Straightforward Commercial Basis

This could all be done on a straightforward commercial basis, i.e., the private firm would pay the RTIC operator (public or private) a daily or per-character fee for the information received. The private disseminator, in turn, would charge its customers--on a subscription basis, per request, or whatever seemed best suited for each niche.

This has the great virtue of simplicity, with each party in the chain certain of their role and their compensation. A disadvantage is that it requires pricing at the wholesale level (the RTIC) something that has proved elusive to price: traveler information.

4.2.3.2 Compensation for Serving the Public Interest

In order to provide motorists with intermodal information that, it is hoped, might change their behavior, the public agencies may require the private disseminator to provide it. In return, the private firm might pay less--possibly even nothing--for the information the firm really wants.

In order to make sure that private firms don't take advantage of this offer, the public agency may impose performance requirements so that the firm doesn't avoid sending information that (the firm may think) the customers don't want.

4.2.3.3 A Sharing of Risks and Revenues

In order to integrate the public interest with the private, a travelshed's public agencies may offer partnerships to private firms trying to open this market. The public agencies would not only contribute the information, but also some funding in order to push intermodal information out. The private firms would benefit by putting up less risk capital and thus reducing their exposure and hurdle requirements.

In order to compensate the public sector, revenues would likely be split at a gross level. That is, the agencies may get (for example) 35% of the partnership's gross revenues. The advantage of using gross revenues is that they are much less subject to calculation that may be politically indefensible.

sustained (or increased) financial commitment to intelligent transportation systems by the public sector will lead to an increased level of confidence in the private sector.

Outside of the operating agencies and the contracting firms that support them, knowledge of intelligent transportation systems is close to nonexistent. Most private enterprises that might develop traveler information products are unaware of intelligent transportation systems, how they work, the state of the art, and where they're going. Historically, most product innovation comes from small engineering firms; it is these firms-outside the transportation and civil engineering domain-that should be the first target of an outreach program. For example, the Coalition might commission an article about the Corridor-wide Traveler Information System in the journal of the Institute of Electrical & Electronics Engineers' Communication Society. Other domains the Coalition might wish to reach out to include the marketing community (for example, through the journals of the American Marketing Association), and developers of private branch exchanges and voice-mail and audiotex systems.

The other activity that the Corridor should undertake is an aggressive public-relations campaign designed to inform the average Corridor citizen. Key elements of the campaign should include:

- + promoting awareness of the Coalition, its goals and objectives;
- + promoting the benefits of ITS to residents of the Corridor; and
- advertising the Coalition's successes.